Set Name side by side	Query	Hit Count	Set Name result set
	DB=USPT,PGPB,JPAB,EPAB,DWPI,TDBD; PLUR=YES; OP=ADJ		
L6	(tile or acoustic tile or acoustical tile) and epichlorohydrin and cellulosic (fiber or fibre) and perlite	4	L6
L5	(tile or acoustic tile or acoustical tile) and epichlorohydrin and cellulosic (fiber or fibre) and expanded perlite	2	L5
L4	(tile or acoustic tile or acoustical tile) and epichlorohydrin and cellulosic (fiber or fibre)	52	L4
L3	(tile or acoustic tile or acoustical tile) and epichlorohydrin	506	L3
L2	tile or acoustic tile or acoustical tile	74720	L2
L1	4239519 [pn]	2	L1

END OF SEARCH HISTORY

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Composites of Polyvinyl Chloride—Wood Fibers: IV. Effect of the Nature of Fibers

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The suitability of different pulps (e.g. chemithermomechanical, kraft, tempure, temalfa, cotton, and sawdust) as well as various wood species (e.g. softwood, spruce; hardwood, aspen and birch) as the reinforcing filler for thermoplastic composites of PVC (two different grades) have been evaluated on the basis of mechanical properties. Mechanical properties of the non-treated composites were improved by the addition of a coupling agent [poly (methylene (polyphenyl isocyanate))] either in pure state or in solution, and by the pre-treatment of the fibers by encapsulation. The order of reactivity of the pulps varies widely with the change in the grades of thermoplastics and the quality of treatment. Due to the interference of properties of the pulps in the composites, the relative reactivity changes.

INTRODUCTION

Composites are one of the most important rapid growth materials conceived to meet the present demand of advanced technology (1). A good reason for gaining such popularity is that many of their physical and mechanical properties can be tailor-made through the judicious selection of filler and matrix. Numerous types of composites can be formulated by combining fillers and matrices (2, 3). Among these thermoplastics (4, 5) as a matrix and cellulose fibers (6–9) as filler are particularly attractive.

The properties of cellulose fiber-filled thermoplastic composites vary widely with the nature of thermoplastics and cellulose fibers.

Apart from the nature of thermoplastics, the properties of the composites vary with the change in the quality of cellulose fibers, e.g. fiber length, fiber-making technique, morphology, inherent physical and mechanical properties, origin, etc. The optimum fiber length, called "critical length", provides a number of advantages (10, 11), e.g. free of entanglement with each other, preservation of all fibrous characteristics, resistance to breakage during mixing, etc. Surface roughness helps fibers to develop a lock and key fit at an interface. Consequently, the force required to separate the adhering materials can be greatly increased. Different pulping techniques offer various ways to separate fibers from the wood chips (12) (e.g. sawdust is prepared by separating fibers mechanically, kraft pulp chemically, while both chemical and mechanical methods are used for chemithermomechanical pulp. Accordingly, surface quality of the different pulps varies widely, e.g. the momechanical pulps (TMP) provides higher specif surface area compared to mechanical pulps (13).

Once again, depending on the origin, i.e. woo species, the morphology, mechanical properties, den sity and aspect ratio (average length to diameter rat of the fibers) also change. For example, softwoo fibers (spruce) are flexible compared to hardwoo (aspen or birch). Again, between aspen and birc the latter is denser. Furthermore, mechanical pro erties are affected by the pulping process even with the same species (14). Unfortunately, the compar tive study of mechanical properties of thermoplast composites containing different wood species in th form of various pulps is limited (15–19).

In the present study, attention was paid to evalua the mechanical properties of composites of polyvin chloride and different cellulose fibers, e.g. cotton ar wood fibers from softwood (spruce) and hardwoo (aspen and birch) in the form of different pulps (e. CTMP, sawdust, kraft, tempure, and temalfa). Th effect of fiber length as well as the performance fibers in the presence of a coupling agent (PMPPI have also been investigated.

MATERIALS

Thermoplastics

Polyvinyl chloride was supplied by two differe companies:

1) PVC—(Baron) treated with 20 percent plast cizer, dioctyl phthalate (DOP); 1.3 percent a